

Notice of Allowability

Application No.

09/857,759

Examiner

Tracy Dove

Applicant(s)

COOPER ET AL.

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 9/9/04.
2. ☒ The allowed claim(s) is/are 1-7, 10, 12, 18 and 19.
3. ☒ The drawings filed on 08 June 2001 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 9/28/04
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

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EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Christopher Spletzer on 9/28/04.

The application has been amended as follows:

1. (Currently Amended) An electrode structure comprising a first catalytic component and a second catalytic component, wherein:
 - (a) said first catalytic component comprises one or more electrocatalyst(s) comprising a of-formula Pt-Y, wherein Y is Mo, W or an oxide of Mo or W; and
 - (b) said second catalytic component comprises one or more electrocatalyst(s) comprising a of-formula Pt-M, where M is a metal alloyed with the platinum and is one or more metals selected from the group consisting of Ru, Rh, Ti, Cr, Mn, Fe, Co, Ni, Cu, Ga, Zr, Hf and Sn; and

wherein the first and second catalytic components are formulated into two separate layers that are functionally linked and are in ionic contact with each other.

2. (Previously Presented) An electrode structure according to claim 12 wherein X is selected from the group consisting of Ru, Mn, Co, Ni, and Rh.

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3. (Previously Presented) An electrode structure according to claim 1, wherein M is selected from Ru or Rh.

4. (Previously Presented) An electrode structure according to claim 1, wherein the first catalytic component is selected from the group consisting of: Pt/Mo, Pt/Mo/Co, Pt/W/Co, Pt/Ru/WO₃ and Pt/Ti/W; and the second catalytic component is Pt/Ru.

5. (Previously Presented) An electrode comprising an electrode structure according to claim 1 wherein the electrocatalyst materials are present on one side of a gas diffusion material.

6. (Previously Presented) A catalyzed membrane comprising an electrode structure according to claim 1 wherein the electrocatalyst materials are present on one side of a polymer electrolyte membrane material.

7. (Previously Presented) An MEA comprising an electrode structure according to claim 1.

8. (Cancelled)

9. (Cancelled)

10 (Currently Amended) A fuel cell comprising an electrode structure, comprising a first catalytic component and a second catalytic component, characterized in that the first catalytic component comprises one or more electrocatalyst(s) comprising a formula Pt-Y where Y is Mo, W, or an oxide of Mo or W, and the second catalytic component comprises one

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or more electrocatalyst(s) comprising a of formula Pt-M, where M is a metal alloyed with the platinum and is one or more metals selected from the group consisting of Ru, Rh, Ti, Cr, Mn, Fe, Co, Ni, Cu, Ga, Zr, Hf and Sn, and wherein the first and second catalytic components are formulated into two separate layers that are functionally linked and are in ionic contact with each other.

11. (Cancelled)

12. (Previously Presented) An electrode structure according to claim 1 wherein said first catalytic component comprises a third metal component X which is alloyed with the platinum and which is one or more metals selected from the group consisting of Ru, Rh, Ti, Cr, Mn, Fe, Co, Ni, Cu, Ga, Zr, Hf and Sn.

13. (Cancelled)

14. (Cancelled)

15. (Cancelled)

16. (Cancelled)

17. (Cancelled)

18. (Previously Presented) A fuel cell according to claim 10 wherein said first catalytic component comprises a third metal component X which is alloyed with the platinum and which is one or more metals selected from the group consisting of Ru, Rh, Ti, Cr, Mn, Fe, Co, Ni, Cu, Ga, Zr, Hf and Sn.

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19. (New) The electrode structure according to claim 1 wherein Y is Mo and M is Ru.

The following is an examiner's statement of reasons for allowance: the claims are directed toward an electrode structure comprising a first catalytic component and a second catalytic component. The first catalytic component comprises an electrocatalyst comprising a formula Pt-Y wherein Y is Mo, W or an oxide of Mo or W. The second catalytic component comprises an electrocatalyst comprising a formula Pt-M wherein M is a metal alloyed with the platinum and is one or more metals selected from the group consisting of Ru, Rh, Ti, Cr, Mn, Fe, Co, Ni, Cu, Ga, Zr, Hf and Sn. The first and second catalytic components are contained in separate layers that are functionally linked and are in ionic contact with each other.

Note "functionally linked" means that both catalytic materials of the claimed invention are in ionic contact with each other by adding an ion conducting material to each of the electrocatalyst layers when they are formulated (page 8, lines 20-24 of the present specification).

The cited prior art does not teach the claimed invention. Wilkinson (US5,795,669) does not teach or suggest the claimed invention. Wilkinson teaches a first catalytic component active at gas-phase reaction sites and a second catalytic component active at electrochemical sites. The first and second catalytic components may be present either as separate layers or a single mixed layer (abstract). However, Wilkinson does not teach when the first and second catalytic components are contained in separate layers, that they are "functionally linked" and are in ionic contact with each other.

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One of skill would not have been motivated to modify the teachings of Wilkinson because Wilkinson teaches away from the claimed invention. Wilkinson teaches that the second catalytic component, active at electrochemical reaction sites, is formulated to ensure a high level of contact with the electrolyte material in order to enhance the amount of ionic contact between the electrolyte and the electrochemical catalytic component. It is desirable that the first catalytic component, active at gas phase reaction sites, should not contact a significant quantity of ionically-conducting electrolyte material and preferably should not contact any, as this may reduce its effectiveness (5:45-53). Therefore, one of skill would not have been motivated to functionally link the two catalytic components of Wilkinson because ionically-conducting material reduces the effectiveness of the first catalytic component active at gas phase reaction sites.

Note that in order for the “two separate layers” to be “functionally linked”, each layer must contain an ionically-conducting material dispersed throughout each layer (as recited on page 8, lines 20-24 of the specification).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Tracy Dove', is positioned above the printed name and title.

Tracy Dove
Patent Examiner
Technology Center 1700
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September 28, 2004